

June 11, 1868.

Dr. J. E. Gray, F.R.S., V.P., in the Chair.

Mr. P. L. Sclater exhibited a very fine and perfect skin of the Australian Cassowary (*Casuarium australis*), which had been transmitted to him by Mr. Charles J. Scott of Queensland, and was believed to be the first example of this species that had reached Europe.

Mr. Sclater alluded to several former occasions on which notices of this species had been brought before the Society\*, and remarked that its rediscovery in Australia was mainly due to the exertions of the Messrs. Scott, who had so kindly interested themselves in the matter, as already recorded in the Society's 'Proceedings' (see P. Z. S. 1866, p. 557).

The present specimen of the Australian Cassowary had been shot in the beginning of November last by Mr. Henry Stone, overseer to Messrs. Scott Brothers and Co., at their station in the Vale of Herbert, in the same scrub from which the specimen described by Mr. Krefft in the Society's 'Proceedings' for 1867 (p. 482) had been procured. Along with the specimen, Mr. Scott had forwarded to Mr. Sclater a careful description of the head and naked parts of the neck, which Mr. Sclater intended to place, along with the specimen, at the disposal of Mr. Gould, in order that the bird might be properly illustrated in the Supplement to the Birds of Australia.

Mr. Sclater further remarked that some naturalists had been inclined to doubt whether the *Casuarium australis* would prove to be really distinct from the well-known *Casuarium galeatus* of Ceram, but that he believed that no one who had examined the present specimen could any longer doubt upon the matter. Mr. Sclater had not yet had an opportunity of making a careful comparison between the two birds; but the following appeared to be noticeable points of distinction between the two species:—

1. The different form of the vertical crest.

It would be observed that in the Australian bird the crest was of a different shape from that of *C. galeatus*, rising much more erect from the head and attaining a much greater development than even in the largest examples of the latter species, of which there was at the present moment a very fine specimen living in the Society's Gardens. In *C. australis* also the crest was extremely compressed towards the edges, terminating in two thin laminæ of horn united in a medial line.

2. The thicker and stouter tarsi, and the greater development and straightness of the elongated claw on the inner toe of *C. australis*.

3. In the fine cobalt-blue colour of the naked throat and front part of the neck, the corresponding parts in *C. galeatus* being of a dull purple.

The following were stated to be the dimensions of the present specimen of *C. australis*, which appeared to indicate that the species

\* Cf. P. Z. S. 1866, p. 557; 1867, pp. 241, 473, 482.

attained a much greater size than *C. galeatus*. Total length, from the summit of the helmet to the end of the caudal feathers, about 72 in.; total height of the crest, from its base to the summit, 5·8; distance from the gape to the end of the bill, in a straight line, 6·1; length of tarsus 13·3; length of inner toe with the nail 6·3, nail of do. 3·5; length of middle toe with the nail 7·0, outer do. with the nail 4·5. The wing in *C. australis* was composed of four or five strong barbless quills, and terminated, as in other species of the genus, by a well-developed claw. The gular caruncle appeared rather to resemble that of *C. galeatus*, being divided nearly down to its base, and terminating in two flaps, which in the present specimens were of unequal length, one measuring 2·3, and the other 3·9, from the junction. These caruncles were sparingly covered with hairs, which Mr. Selater had not noticed in the case of the other Cassowaries.

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Dr. A. Günther, F.R.S., made some observations on the various species of *Clupea* found on the British coasts, which were stated to be five in number, namely, the Herring (*Clupea harengus*), the Spratt (*C. sprattus*), the Alice-Shad (*C. alosa*), the Twaite-Shad (*C. finta*), and the Pilchard (*C. pilchardus*). Dr. Günther showed, by the exhibition of various specimens and diagrams, that the so-called *C. alba*, or Whitebait, which had been considered by several authors a distinct species, and by Prof. Valenciennes had been even elevated into the rank of a distinct genus (*Rogenia*), was nothing more than the young of the common Herring. Dr. Günther likewise referred *C. leachii* of Yarrell to a well-developed variety of the Herring, and considered the so-called *Alosa squamo-pinnata* of Couch (Brit. Fish. iv. p. 123, t. 206) a hybrid between the Pilchard and one of the two Shads.

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Mr. Tegetmeier called the attention of the Society to the progress recently made in Salmon-breeding at the Stormontfield ponds, on the Tay. In November 1867, 350,000 eggs were spawned artificially and deposited in the ponds: of these 200,000 were hatched this spring. The smolts of last and the previous year, which left for the sea during May 1868, were very much larger than those of previous seasons—the fishes of one year old being as large as those of two years' age of previous seasons. This great increase of size was evidently owing to the change which had been effected in their dietary. Formerly the fish were fed during their smolt-condition on boiled ox-liver rubbed down to coarse powder. Recently the aquatic weeds in the ponds had become covered with *Limnæa peregrina*, on which the fish had fed greedily, and to which the great increase of size was undoubtedly to be attributed.

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Mr. E. T. Higgins exhibited and made remarks on a skin of a variety of the Puma (*Felis concolor*) from the southern part of South America.

The following papers were read:—

1. On the Development and Succession of the Teeth in the Armadillos (*Dasypodidae*). By WILLIAM HENRY FLOWER, F.R.S. &c., Conservator of the Museum of the Royal College of Surgeons.

With one exception, all writers on the dentition of the Armadillos, whose works I have been able to consult, have either contented themselves with describing the teeth found in full-grown specimens, passing over in silence the question of their development and succession\*, or have assigned these animals, with the rest of the Edentata, to the section of mammals termed “monophyodont,” or those that generate a single set of teeth†. The exception I allude to is Professor Gervais, who, in his ‘*Histoire naturelle des Mammifères*’ (1855, vol. ii. p. 252), makes the following observation, accompanied by a figure of the specimen described:—

“Leurs mâchoires, qui sont grêles et plus ou moins allongées, sont toujours garnies de dents, mais ces dents varient pour la forme et pour le nombre, suivant les différents genres. J’ai pu constater leur mode de remplacement, dont aucun auteur n’avait encore parlé, et qui diffère beaucoup de celui des autres Mammifères. Dans le Cachicame, le seul Tatou que j’aie encore observé sous ce rapport, les molaires de lait, qui sont au nombre de sept en haut et en bas, sont moins arrondies que celles de la seconde dentition, et leur racine se dédouble en un chevron, dont les deux branches peuvent se séparer l’une de l’autre par suite de l’usure de la partie coronale. Les dents de remplacement poussent immédiatement au-dessous de celles de lait, qu’elles chassent comme des coins, en se plaçant entre les deux branches de leur racine. C’est un mode de remplacement bien plus semblable à celui des Crocodiles qu’à celui des Mammifères hétérodonates.”

As this observation has an important bearing upon the general principles laid down in all attempts to reduce the laws of the succession of mammalian teeth to a symmetrical and harmonious system, and has hitherto received very little, if any, attention from subsequent writers, I thought it desirable to investigate the subject afresh, and, if possible, set at rest any doubts which might exist regarding it.

Fortunately, I have been able to examine the early dentition of a sufficient number of animals, of the same species as that referred to by Professor Gervais, the common Nine-banded Armadillo (*Tatusia peba*, Desm.), fully to confirm his observation, and to supply some further details towards the completion of our knowledge of the successive stages of the process of dental development in this animal.

\* Rapp, in his well-known monograph on the Edentata (1843), says, “Ueber einen Zahnwechsel ist mir bei den Edentaten nichts bekannt” (p. 52).

† Owen, *Cylop. of Anat. and Phys.* (art. Teeth) vol. iv. p. 901; *Anat. of Vertebrates*, vol. ii. p. 278 (1866).

I will describe the specimens examined in the order of their respective ages. The first three are preserved in spirit in the Museum of the Royal College of Surgeons; the fourth is a skeleton in the British Museum.

1. In a foetal specimen, of which the head was 1''·6, the body 3'', and the tail 2''·7 long, there was no appearance of teeth above the gums; on each side of the mandible and of the corresponding part of the maxilla were the germs of seven teeth, each consisting of a soft papilla, enclosed in a round follicle. On stripping up the mucous membrane covering the edge of the jaw, they all came away attached to it, leaving the dental groove, with seven distinct alveolar depressions, quite clean. They were all in nearly the same stage of development; but those in the middle were rather larger than those at either extremity of the series. The length of the row of teeth above and below was almost exactly the same, viz. 0''·32.

2. In the next specimen the head was 2½'', the body 6'', and the tail 6½'' long. In the upper jaw, on each side, the apices of five teeth were just appearing above the mucous membrane; beneath the membrane, behind these, were the calcified germs of two others, making seven in all. They were all mere caps of calcareous matter, widely open below, their height scarcely exceeding their width at the base; the apices were rounded, the first simple and compressed, the second slightly wider but also simple, all the others double the width of the first, and divided by a longitudinal groove into an inner and an outer cusp, of which the inner was rather the larger. The entire tooth-row was 0''·55 long.

The lower jaw had also seven teeth on each side in a corresponding state of development—the first very small and single-pointed, all the others with a bicuspid apex, the inner cusp being higher and more pointed than the outer. On the left side, 0''·1 in front of the first of these teeth, was a minute calcified tooth scarcely larger than a blunt pin's point. I could not find one corresponding to it on the other side, or in the upper jaw, or in any of the other specimens examined; so its presence may have been an individual peculiarity. The other teeth were all in close apposition to one another.

3. In the third animal the head was 3¼'', the body 8'', and the tail 10'' long. In the upper jaw there were seven teeth on each side, the points of all of which had cut the gum, but were quite unworn; and there was a minute uncalcified germ of the eighth in a distinct alveolar socket close behind the seventh. All, except the much compressed first had bilobed crowns (the divisions being not very distinct in the second). In the teeth about the middle of the series, which were the largest, the calcified portion was 0''·15 long, quite simple, open, but rather contracted at the base. The tooth-line was 0''·75 long. The lower jaw showed a precisely corresponding condition. Rather below the middle of the inner wall of the alveolar cavities, most conspicuous in the lower jaw, were distinct little pits filled with a soft substance. These, as shown by the examination of the next specimen, were the germs of the second or permanent teeth.



4. In a skull (No. 911 B, Brit. Mus.) rather smaller though more mature than the last, the seven milk-teeth described in the last specimen are in place and much worn at their summits; there is also a small cylindrical posterior or eighth tooth in each side of each jaw. Of the milk-teeth, the first is the smallest, being much compressed, the second is rather broader, the remainder considerably broader and nearly equal. The upper ones are pointed, being bevelled in front and behind. The lower ones are worn mostly on the outside, and have a much more acute apex than the upper ones. The fangs of all are closed at the base, and more or less hollowed by absorption on the inner side, this absorption proceeding sometimes so far as to give a two-rooted appearance to the tooth. At the bottom of each alveolus (as is easily seen when the milk-tooth is removed), and at its inner side (in both jaws), is a distinct recess, in which lies the calcified conical apex of the germ of the permanent tooth, the outer surface of which lies against the hollowed part of the root of the milk-tooth. These germs are all of nearly equal development. The length of the longest upper milk-tooth, from apex to base, is 0''·22, of the longest lower one 0''·25. The length of the tooth-line in each jaw is 0''·7. The milk-teeth are slightly smaller than those of the adult, but otherwise differ very little from them in appearance. They have, however, the important difference of the closure of the base of the fang, causing arrest of growth. The eighth tooth appears to have no predecessor, and consequently is the only true molar.

Professor Gervais's observation supplies the next stage; judging from the size of his figure, the animal must attain almost to the dimensions of the adult before the milk-teeth are finally shed. The appearance of double roots which he describes is due only to the absorption of the middle part of the fang, in consequence of the pressure of the growing permanent tooth, which, as in other Mammalia, is placed, in the early stages of growth, not immediately below, but to the inner side of the milk-tooth.

A striking exception has thus been shown to a widely accepted generalization. The question naturally arises, Is this really the only exception, and is the generalization itself a sound one? It is most desirable that the teeth of other species of Armadillo should be examined; but it is a singular circumstance that so insufficient are our public zoological collections, that I have not yet been able to find a single example of the right age to throw any light on this question. All available specimens are either too old or too young. With the exception of the one species above described, all statements in reference to the succession of the teeth of these animals appear to rest upon no sufficient basis of observation.

2. On certain New and Rare Species of Birds found at Rockingham Bay, Queensland. By E. P. RAMSAY, C.M.Z.S.

As some of my scientific friends are doubtless aware, I despatched Mr. E. Spalding, an experienced collector, to Rockingham Bay during October 1867, with instructions to procure as complete a collection as possible of all north-country species found in that and the surrounding districts, and particularly to obtain all the information he could respecting the Australian Cassowary (*Casuaris australis*).

The following, then, is a list of the most interesting species found in this locality, and descriptions of such of them as I deem to be *new*.

1. HALIASTUR LEUCOSTERNUS.

This species is common as far south as Port Denison; and a few stragglers have wandered down to the Richmond and Clarence River-heads, New South Wales.

2. ASTUR, sp.

Agrees with Mr. Gould's description of *A. cruentus*, but has no rufous collar. This specimen was accompanied by a young bird, just able to fly, and which coincides with *A. approximans* exactly. Total length 20 inches; wing from flexure 11, tail 9.

3. ASTUR APPROXIMANS.

The above mentioned young bird. There is no difference between the West-Australian and the New-South-Wales individuals of this bird.

4. ASTUR (♀), sp. nov.

Two specimens shot, both alike. Total length (of skin) 20 inches.

Whole of the upper surface dull slaty brown, lower part of hind neck brown. Wings above slaty brown; underneath white, except the tips of the quill-feathers, which are slaty grey; the basal portion of the inner webs of the secondaries and tertiaries barred with greyish brown to within one-third of the width of their inner margin; edges of the wings barred with brown at the base of the primaries. Sides of the head and neck slaty brown, the feathers on these parts being white barred and margined with slaty brown. Whole of the under surface white; the throat, neck, chest, breast, and flanks crossed with wavy bars of brown, broader and inclining to arrow-shaped markings on the breast and flanks. Upper tail-coverts and tail barred with blackish brown; underside of tail-feathers light slate-grey, the bars distinctly showing through on all but the two centre feathers; inner webs of all lighter, becoming white at the base. Bill jet-black, yellow at the base; cere, legs, and feet yellow, claws black; irides deep orange.

Total length 20 inches; wing from flexure 11·2, tail 8·4; bill, from angle of mouth 1·3, from the forehead along culmen to tip 1·6,

from cere along culmen to tip 1, height at base 0·9, width 1·2 (on lower edge of upper mandible); lower mandible from angle of mouth 1·25, width at base 0·5; height of upper mandible from tooth to cere 0·6, its width at tooth 0·4; length of the head and bill 2·8, width 1·6, tarsi 3·2; first toe 1·2, its claw 1·3; middle toe 2 in., its claw 1 lin.; third toe 1·3, its claw 0·8; hind toe 1 inch, its claw 1·4; ditto from base to tip in a straight line 1·1, along the curve 1·4, its circumference at base 0·6, height 0·25, width 0·2; all the claws are much arched, thick and strong; tarsi thick and very powerful.

Although this bird is in many respects like what one would expect to find the young of *Astur novæ-hollandiæ* (alias *A. rayii*), I believe it to be of a distinct species. It is true, and, I suppose, well known, that the individuals of this latter species differ greatly in size, and, as many will not admit, in the colouring of the females. As regards this last fact I have instances of grey-backed females pairing with wholly white males; and if the New-South-Wales birds are really distinct from the Tasmanian, it will be in the fact that the females of the New-South-Wales birds are frequently grey-backed, while the Tasmanian birds are never so. A very intelligent collector, from whom I have had some valuable specimens of eggs, Braisher by name, told me, a few days ago, that a pair of this species had taken up their abode near his farm, in the Illawarra district, and that he felt sure of getting a reward I had offered for their eggs. Upon my asking how he knew that they were a pair, he replied, that one of them had a "blue" (grey) back. Nothing that I could say would persuade him to the contrary; and he affirmed that he had shot scores of them. During the breeding-season, Rainbird, a collector at Port Denison, sent me down a pair, of which that marked the female has the back grey. On questioning Rainbird, he informed me these had mated, and, he felt sure, had a nest hard by.

Nevertheless I shall wait until I have obtained the young from the nest before I consider the points fully settled, both with respect to the *Astur rayii* and *A. novæ-hollandiæ* being one species, and whether the bird I have described above be their young or that of a new species. At present I consider it to be new on account of its strong markings, greater size, and much stronger build, besides having the upper surface brown instead of a shade of grey. It is, moreover, a heavier-built bird, inclining to *Astur* rather than to *Leucospiza*.

##### 5. ELANUS AXILLARIS.

The young of this species have the upper surface dull brown, wings and tail blue grey, shoulders black, and the feathers of the breast centred with a black line, which ends in a yellowish spot at the tip.

##### 6. PODARGUS, n. sp.

From Cleveland Bay.

7. *PODARGUS*, n. sp.

From Rockingham Bay, thirty-five miles inland.

Although at present I feel convinced that both these species are new, I do not feel equal to the task of describing them until I have compared them with those in the fine collection of the Australian Museum.

8. *PODARGUS PAPUENSIS*.

Only one specimen obtained.

9. *CAPRIMULGUS MACROURUS*.10. *ALCYONE PUSILLA*.

Length of bill from angle of mouth 1·3 inches, from the forehead 1; wing from flexure 2, tail 0·8, tarsi 0·25. Bill black; legs and feet greenish-grey. Total length 4·3.

11. *TANYSIPTERA SYLVIA*.

The furthest south that this bird has been found, I believe, is Port Denison. The females differ from the males in having the two centre tail-feathers shorter, and their outer webs margined (rather broadly at the base, and gradually becoming narrower) with blue to within an inch of their tips; shafts black above, white underneath; the feathers on the rump of many specimens are also margined with blue.

12. *ARTAMUS ALBIVENTRIS*.

Bill deep blue at base, separated from the black of its tip by a triangular whitish-blue oblique mark; some are without this mark—the base being waxy blue, and the tip black. Total length 6·6 to 6·9; wings 4·4 to 4·8; tail 2·7 to 3; bill, from angle of the mouth 0·8 to 0·9, from forehead 0·7 to 0·75.

13. *CRATICUS QUOYII*.

A rare and shy species, found among the mangroves.

14. *PIEZORHYNCHUS NITIDUS*.

Tolerably abundant in brushes near the bay.

15. *OPHRYZONE KAUPI*.

*Arses kaupi*, auct.

One pair of this very interesting and rare Flycatcher were all that were seen; they were obtained on the edge of a dense brush, some thirty-five miles inland.

In habits and actions this pretty species closely resembles the species of *Monarcha*; they are lively and active, like the *Rhipidura albiscapa*, but do not fan the tail like that species.

One peculiarity which seems to have escaped Mr. Gould's scrutiny is the enlargement of the eyelid into a narrow flat rim, crenulated on its outer margin. This rim, which is  $\frac{1}{20}$  inch in width,



and encircles the whole of the eye, is of a bright indigo-blue in the living bird, and gives it a very curious and remarkable appearance; this fact, added to the *unproportionably long hind toe and nail*, may, in some degree, help to decide to which genus the bird really belongs, or form sufficient grounds for the foundation of a *new genus*. If such be deemed the case, I beg to propose the generic term *Ophryzone*, on account of these peculiarities.

In one of my specimens, said to be the male, the chin is white, while in the female it is black; the upper tail-coverts are black, and the under white, in both sexes. The female, perhaps a young bird, has the feathers of the white collar tipped with black, and is only faintly marked with white on the lower part of the back and rump. In this specimen the black of the ear-coverts is joined with the band on the breast at the shoulders.

#### 16. MACHÆRIRHYNCHUS FLAVIVENTER.

Spalding was fortunate enough to obtain three specimens of this beautiful bird—a pair of adults and their young one. The female differs only in having the under surface paler, the back olive-brown, and the throat and under wing-coverts white. The young is similar in plumage to the adults; but in it the yellow markings are almost white.

*Male and female.* Total length 5 inches; bill from the angle of the mouth 0·8, from forehead 0·65, breadth 0·35, height 0·15; wing 2·3; tail 2·15; tarsi 0·5.

This species frequents the densest parts of the brushes. The specimens were obtained thirty-five miles inland, and were the only individuals seen, although the place was frequently revisited.

#### 17. PÆCILODRYAS SUPERCILIOSA.

Found tolerably plentiful as far south as Cleveland Bay. I have also received specimens from Port Denison.

#### 18. EOPSALTRIA AUSTRALIS.

The specimens of the yellow-breasted Robins obtained at Rockingham Bay differ slightly from the *E. australis* of New South Wales in the browner tint of the upper surface, in the deeper yellow of the breast, upper tail-coverts, and rump, and in having a longer and much stouter bill, and are probably of a distinct species.

Specimen from Rockingham Bay.	Specimen from Dobroyde, New South Wales.
Bill, from angle of the mouth . . . . .	0·75 in.                      0·65 in.
Bill, from forehead . . . . .	0·65                          0·55
Bill, width at base . . . . .	0·25                          0·2
Bill, height at base . . . . .	0·2                            0·15
Wing, from flexure . . . . .	3·3                            3·05
Tail . . . . .	2·6                            2·4
Tarsi . . . . .	0·8                            0·75

One specimen from Rockingham Bay has the inner webs of the

outer two tail-feathers margined with white. This is said to be a female, and is slightly smaller in size. I scarcely consider these differences sufficient for the foundation of a new species, notwithstanding many have been founded upon less, but for the present will defer the matter until I have obtained other specimens from the same locality.

#### 19. *CISTICOLA RUFICEPS*.

During the last two years I have been getting together a series of this species for comparison, from all parts of Australia. It ranges from Cape York to Adelaide, South Australia. The young males resemble the females in having the head and all the upper surface striated black and rufous buff. Adult males, with rufous head and rump, are frequently found with half-grown wings and tails: this is one theory. Another is, that Mr. Gould's *C. ruficeps* is the young of *C. exilis* or *C. isura*; and with this I am at present most inclined to agree. My specimens throw no light on the subject, save that I have no examples of the rufous-headed and rumped birds with *long, or fully grown tails*, while I have specimens of the same with short tails and a few striated feathers on the crown. I believe *C. ruficeps* of Mr. Gould to be *the young*, and perhaps the *young male alone* of the striated birds, which may be either *Cisticola exilis*, *C. isura*, or *C. lineocapilla*, Mr. Gould's descriptions (?) of each being referable to the striated females of *C. ruficeps*.

The size of *Cisticola ruficeps* varies according to the age of the bird, the young ones with short tails being only 2 inches, the striated adults 4·7 (including their long tail), rufous-headed males 4·5 inches; so that no specific value can be placed on measurements of the tails. The wings differ by  $\frac{1}{10}$  inch, and the bills by  $\frac{1}{20}$  inch.

The nest of *C. ruficeps* is a neat, round, cup-shaped structure, composed of grass, hair, interwoven with cobweb, and half suspended by the branches and stems of grass and weeds amongst which it is placed. The eggs are three in number, light blue blotched and dotted with dull reddish brown.

#### 20. *CHLAMYDODERA NUCHALIS*.

#### 21. *MIMETA FLAVOCINCTA*.

#### 22. *SPHECOTHERES FLAVIVENTRIS*.

#### 23. *CALORNIS METALLICA*.

#### 24. *GLICIPHILA SUBFASCIATA*, sp. nov.

*Female*. Total length 4·8 inches; bill, from the angle of the mouth 0·6, from forehead 0·5, width at base 0·2, across nostrils 0·1; wing, from flexure 2·5; tail 2; tarsi 0·65.

The whole of the upper surface, sides of the head, and neck glossy brown, a short oblique stripe under the eye white, feathers on the crown of the head centred with dark brown. The whole of the under surface and the extreme tips of the ear-coverts silvery white. The chest faintly barred with lines of brown, which join the sides

of the neck above the shoulders; flanks and under coverts of wings tinged with brown, under surface of the wing dark brown, the inner margins of the feathers whitish brown; bill and legs reddish horn-brown.

An egg taken from the oviduct is white, thinly dotted with black, 0.75 in length by 0.5 inch in breadth.

#### 25. *PTILOTIS VERSICOLOR?*

Young in half plumage; beautifully mottled, on both under and upper surface, with triangular markings of black and yellow.

#### 26. *ORTHONYX SPALDINGI*, sp. nov.

*Male.* The whole of the head, cheeks, and ear-coverts, the sides of the head, sides and back of the neck, the sides of the chest, and the shoulders jet-black. Wings above brownish black, the feathers broadly margined with dark brown; primaries and outer webs of the secondaries brown, lighter on the outer webs of the primaries. Chin, throat, chest, and centre of breast, as far as the abdomen, white; sides of the breast, flanks, upper and under tail-coverts, rump, and back olive-brown; base of the feathers and abdomen dull slaty brown; the tail, lower part of hind neck, and between the shoulders blackish brown; bill black; eyelid flesh-white; irides blackish brown; legs and feet brownish black. The tail is long and pointed, two outer feathers one-fourth less than the centre ones, the shafts of which are black, and much curved downwards, but not so much worn into spines as in the remainder of the feathers.

Total length (of skin) 11 inches; wing, from flexure 5.2; tail 5 inches; tarsi 1.9; bill, from angle of mouth 1 in., from forehead 0.9, its width at base 0.4, height 0.4.

The female differs from the male in having the olive-brown tinge on the upper and under parts of a reddish-brown tint, and in having the centre of the chin, throat, and chest rich deep rust-red, from which a triangular patch of white descends, lessening in width, over the breast to the abdomen; the rest of the plumage as in the male; bill black, irides blackish brown, eyelid flesh-white.

Total length (of skin) 5.5 inches; tail 4.1; wing, from flexure 4.5; bill, from angle of mouth 0.9, from forehead 0.85, height 0.3, width 0.3; tarsi 1.8. Legs and feet blackish brown.

*Remarks.*—This fine species was obtained in a dense brush about thirty-five miles inland, and is a valuable addition to our avifauna, being the second species of this anomalous genus (*Orthonyx*). Its much greater size and jet-black plumage at once distinguish it from *Orthonyx spinicaudus* of the New-South-Wales brushes, to which, however, it closely assimilates in habits and actions, frequenting the thickest parts of the scrubs, and obtaining its food by scratching among the fallen leaves and *débris*.

I beg to propose the specific name of *spaldingi* for this new species, after its discoverer, who has worked hard in the ornithological line for many years, and added to my collection many valuable and rare birds.

27. SITTELLA LEUCOPTERA.

Of this species I received only two specimens, which I suppose must be young females. They have the whole of the head, neck, and throat black; chest and remainder of the upper surface silky white, with a black stripe down the centre of each feather.

28. GEOPELIA PLACIDA.

Whether this species be considered a variety of *G. tranquilla* does not much signify; suffice to say that there is not the slightest difference of plumage between these two birds. The following are the admeasurements of both:—

*Geopelia tranquilla, from New South Wales.*

Total length . . . . .	7·9 inches.
Tail . . . . .	3·85
Wing . . . . .	4·
Tarsi . . . . .	·55
Bill, from angle of the mouth . . . . .	·65
Bill, from forehead . . . . .	·48 to ·5

*Geopelia tranquilla, var.? "placida," from Rockingham Bay.*

Total length . . . . .	7·6 inches.
Tail . . . . .	3·85
Wing . . . . .	4·
Tarsi . . . . .	·53
Bill, from angle of the mouth . . . . .	·6
Bill, from forehead . . . . .	·46 to ·5

29. MEGALOPREPIA MAGNIFICA, var. ASSIMILIS.

A smaller race than the New-South-Wales birds, but identical in plumage.

30. ARDEA SUMATRANA.

A fine pair of adults, accompanied by their young one, were obtained, the latter in an extremely interesting stage of plumage. The whole of the upper surface dark bluish slate-colour, each feather, with the exception of the primaries, secondaries, tertiaries, and tail-feathers, broadly tipped with chestnut; the wing-coverts broadly margined and tipped with the same; feathers of the head and the whole of the neck dull dark slate-colour, centred and largely tipped with chestnut; chest, breast, flanks, and abdomen chestnut, the base of the feathers being dark slate-colour, under surface of wings (except the quill-feathers) and the under tail-coverts tipped with chestnut; upper tail-coverts dark slaty blue.

These specimens were shot thirty-three miles up the river.

31. BUTORIDES FLAVICOLLIS.

32. BUTORIDES JAVANICA.

33. ARDETTA PUSILLA.



34. *PARRA GALLINACEA*.35. *ERYTHRA QUADRISTRIGATA* ♀.

An egg taken from the oviduct of this specimen is of a dirty greenish white, the ground-colour almost obscured by dots, spots, and a few blotches of brownish red and yellowish brown, many of the larger markings appearing beneath the surface; length 1·08 by ·86.

36. *CHLAMYDOCHEN JUBATA*.

Very scarce at Rockingham Bay.

37. *NETTAPUS PULCHELLUS*.38. *DENDROCYGNA VAGANS*.39. *ANOUS STOLIDUS*.

Caught on the yard-arm of the ship, while off Port Curtiss.

40. *CASUARIUS AUSTRALIS*.

I regret extremely that, although Cassowaries were seen on several occasions, none were obtained. The black troopers accompanied Spalding on many occasions in search of them; but although the birds were seen they could not be got at otherwise than by lying in wait for them at dusk, which, on account of the hostility of the native blacks, could not be attempted without great risk of life.

## 3. Descriptions of Four New Species of Birds from Veragua.

By P. L. SCLATER, M.A., Ph.D., F.R.S., and OSBERT SALVIN, M.A., F.L.S. &c.

1. *PYRANGA TESTACEA*, sp. nov.

*Pyrranga hepatica*, Salv. P. Z. S. 1867, p. 139.

*Testaceo-rubra unicolor, subtus clarior: loris obscure cinereis, alis intus fusco-nigris, extus dorsii colore limbatis: rostro nigricanti-corneo, dente maxillari medio distincto; mandibula ad basin flavicante: pedibus obscure corylinis: long. tota 7·0, alæ 3·6, caudæ 3·1, rostri a rictu 0·9, tarsi 0·85.*

♀. *Flavicanti-olivacea, subtus aureo-flava; pectore et lateribus olivaceo perfusis; subalaribus flavis.*

*Hab.* Veragua; Chitra et Calovevora (*Arcé*).

*Obs.* Proxima *P. hepatica*, sed crassitie multo minore, et colore saturatiore distinguenda.

In *Arcé*'s earlier collections from Veragua was a single skin of a male Tanager of this genus in transition plumage, which Salvin, misled by the prominent maxillary tooth, referred to *P. hepatica*. Several skins of both sexes of the same bird are in *Arcé*'s recent collections, and show that the species is essentially distinct from the northern bird. It differs in its much smaller size, in its very distinct maxillary tooth (which is as prominent as in *P. bidentata*), and

in the colouring of both sexes. Above, the male is of a rich brick-dust red, without any of the greyish tinge of *P. hepatica*; below of the same colour, but brighter than above. Corresponding differences are met with in the opposite sex—the female of *P. testacea* being of a uniform yellowish olive above, and of a much brighter yellow below, than that of *P. hepatica*.

## 2. CHLOROSPINGUS HYPOPILEUS.

*Supra flavicanti-olivaceus, loris cinereis: subtus pallide fulvescenti-fuscus; gutture flavo, medialiter fere albicante; hypochondriis et crisso olivaceo perfusus: rostro nigricanti-corneo; mandibula ad basin albicante: pedibus fusco-olivaceis: long. tota 5.5, alæ 2.7, caudæ 2.0, tarsi 0.7, rostri a rictu 0.65.*

*Hab.* Veragua, Calovevora (Arcé).

*Obs.* Similis *C. flavigulari*; sed crassitie minore, corpore subtus fuscescente nec clare cinereo, et gutture medio albicante differt.

Sclater's specimen of *C. flavigularis* from Nanegal (P. Z. S. 1860, p. 86) is somewhat intermediate between this species and *C. flavigularis*. It has the dull-coloured under surface of the former bird; but its throat is wholly yellow, and its crissum yellowish green, as in the latter.

Several specimens of *C. hypophæus* are in Arcé's most recent collection. The sexes, as determined by him, are marked alike.

## 3. LEPTOTRICCUS SUPERCILIARIS, sp. nov.

*Supra viridi-olivaceus; alis caudaque nigricantibus, flavicanti-olivaceo extus marginatis; pileo et collo postico nigricanti-cinereis, superciliis castaneis; linea frontali et regione parotica albis: subtus margaritaceo-albus, pectore, præcipue ad latera, cinereo perfuso, ventre et crisso flavicantibus; subalaribus albis: rostro nigro, pedibus fuscis: long. tota 4.0, alæ 2.0, caudæ 2.0, rostri a rictu 0.55, tarsi 0.65.*

*Hab.* Veragua, Chitra (Arcé).

This remarkable species seems to agree best in generic characters with *Leptotriccus sylvicola* of Brazil, having the long slender tarsi, small delicate feet, pointed wings and long tail which distinguish that form, though the bill is somewhat larger and rather wider. It may be at once recognized by the small but distinctly marked superciliary stripe, which commences above the lore and passes to the back of the eye.

The second primary is equal to the fourth in length, and hardly exceeded by the third; the fifth is barely shorter than the fourth; the first is long, but rather shorter than the seventh.

Two specimens of this apparently undescribed species are in Arcé's collection.

## 4. EUPHERUSA EGREGIA, sp. nov.

*Supra læte viridis, remigibus primariis fuscis purpurascente tinctis, secundariis ad basin castaneis, horum autem apicibus purpurascentibus: subtus nitenti-viridis, ventre albicante:*

*caudæ rectricibus duabus utrinque externis albis, extus nigro irregulariter marginatis et terminatis; sex mediis nigris, supra in pogonio exteriori æneo tinctis: rostro nigro, pedibus flavis: long. tota 4.0, alæ 2.3, caudæ 1.4, rostri a rictu 0.85.*

♀. *Corpore subtus albo, plumis quibusdam lateralibus nitente viridi marginatis; caudæ rectricibus duabus lateralibus omnino albis.*

*Hab.* Veragua; Castello et Calovevora (*Arcé*).

*Obs.* Affinis *E. eximia* et ejusdem formæ, sed rectricum laterali-um pogoniis externis albis distinguenda.

*Arcé* has sent two specimens of this apparently distinct species of *Eupherusa* in one of his recent collections from Western Veragua. The male is not quite adult, and would probably eventually lose all traces of the irregular dark margins of the outer tail-feathers, as in the female no traces of these spots appear. In *E. eximia* the whole outer web of the two external rectrices is black, which renders the two allies readily distinguishable.

The present bird is the only second species of true *Eupherusa* we have yet met with. Mr. Lawrence has assigned three other birds to this genus—namely *Eupherusa niveicauda* (*Ann. L. N. Y.* viii. p. 134), *E. cupreiceps* (*ibid.* p. 348), and *E. nigriventris* (*Pr. Acad. Phil.* 1867, p. 232). Of these, the first, which is the same as *Thaumantias chionura*, Gould (*Cf. Salvin, P. Z. S.* 1867, p. 156), and the second are very closely allied, but are perhaps better placed in the genus *Thaumantias*. Of the third we have not yet been fortunate enough to obtain specimens.

#### 4. Sundry Notes on Indian Raptores.

By R. C. BEAVAN, Bengal Staff Corps, C.M.Z.S. &c.

(Plate XXXIV.)

Having in my papers in the 'Ibis,' 1865, p. 400, 1867, p. 430, and 1868, pp. 73 & 165, entitled "On various Indian Birds," omitted all mention of the Birds of Prey that I have at various times come across in India, I propose to supply, in a few short notes, the deficiency, and thus to form a complete record of my collections (with the exception of the large families of the game and wading tribes, of which I hope to be able to treat hereafter). As in former papers, the numbers and nomenclature used are taken from Jerdon's 'Birds of India,' our best authority on the subject.

##### 1. VULTUR MONACHUS, Linn. The Great Brown Vulture.

This large bird appears regularly every cold weather at Umballah, which is the only station in the North-west Provinces of India in which I have ever noticed it. It is not common, but may frequently be seen high in the air soaring, and is easily distinguishable from the other species of its kind both by its much larger size and its peculiar black appearance. It is much more wary, too, when on



S

$\frac{1}{4}$

J. Smith del.

M. G. N. Enhart. imp.

NEOPUS MALAIENSIS





the ground, and not easy to approach within shot of any weapon except a rifle.

Col. Tytler, however, was lucky enough to secure a pair of this fine bird at Umballah, in the cold weather of 1865-66, and he sent an account of it to the 'Journal of the Asiatic Society of Bengal,' which was published in March 1866, p. 74. His dimensions are worth recording, as they differ slightly from those noted by Jerdon, and were taken from a freshly killed specimen, to my certain knowledge. Length 43 in., wing 33, head and bill  $6\frac{3}{4}$ , tarsus  $5\frac{1}{4}$ , mid toe and claw 6, extent 8 ft. 2 in. ; weight 17 lbs.

Blyth, in 'Ibis,' 1863, p. 24, gives its habitat as "the mountainous parts of Europe and Asia, but rare in the plains of India." As far as my personal experience goes, I have never once noticed it either at Simla or Darjeeling, the only two hill-stations with which I am at present acquainted.

2. *OTOGYPS CALVUS*, Scop. Black Vulture. Vulgo "King of the Vultures" of European residents in India.

On the 15th March, 1865, I found a nest of this species at Ramnuggur, a small village in the Maunbhoom district of Chota Nagpore. This village, which consists of only a few huts, is situated at the foot of a peculiar-looking and steep hill, called Parasa; and the top of this hill being a station of the Great Trigonometrical Survey of India, it will probably be found marked in a fair-sized map. Half-way up the hill I came across a curious-looking low tree with a thick spreading top, in the middle of which latter, carefully concealed among the vegetation, was a large nest of sticks loosely put together; in it I found a single egg. The old bird flew off the nest as I approached, and to my surprise I recognized it as the female of this species. There was but this single egg, which I was only just in time to secure, for the young bird had already begun to chip his way out. I got him out, however, after some difficulty, and found the dimensions of the egg to be in length  $3\frac{3}{8}$  in., breadth  $2\frac{3}{8}$ ; in colour it was dirty white.

The bird is tolerably common in Maunbhoom, and a carcass generally attracts two or three amongst hundreds of *Gyps bengalensis*.

3. *GYPVS FULVUS*, Gmel. Large Tawny Vulture.

This bird is abundant up country, about the stations of the North-west Provinces of India, and in the hot weather apparently visits the hills; for I saw a very fine one seated on the top of a high pine tree at Mahasoo, beyond Simla, on 29th September, 1866, in front of the dâk bungalow. At it I fired with a ball, but without the slightest effect.

In the plain-country about Umballah it is peculiarly abundant at certain seasons. One I shot in the cold weather of 1865-66 at Sirhind measured in the flesh as follows:—Expanse from wing to wing 8 ft. 2 in. ; length 3 ft. 7 in. ; wing 2 ft. 2 in. ; tail 1 ft. 2 in. ; tarsus 4 in. ; bill at front nearly 3 in., its height  $1\frac{5}{8}$ ; mid toe and claw  $5\frac{1}{2}$ ; weight  $14\frac{1}{2}$  lbs. No feathered tarsus. Scuta on all the toes.

5. *GYPS BENGALENSIS*, Gmel.

Breeds in Maunbhoom in February, choosing for the purpose almost invariably a large semul or cotton-tree, which at that time of year loses its leaves and puts forth its fine scarlet flowers; hence the nest, which is generally placed at the junction of two large limbs, or at the diverging point of several branches from the trunk, is plainly visible, but not easy to get at; for the Vulture chooses the largest trees it can find, and most of them are smooth, large in girth, and devoid of branches near the ground.

The nest is circular, compactly built of fresh twigs with the leaves on. Eggs two, dirty white, frequently blotched with red, which, however, is either blood or dirt, for it is removeable by brushing with soap and water.

On my way down to the plains from Simla in October 1866, I came across several of this species, which I have found abundantly distributed in every part of the plains of India hitherto visited by me. On the occasion alluded to, numbers of cattle had been used for the purpose of carrying down baggage from Simla to the plains, and, as a matter of course, several had died on the way. One which I found on the roadside was surrounded by crowds of these Vultures. On going up to examine it I disturbed above forty of them, most of which flew up into the neighbouring trees. On going near the carcass I was surprised to hear a rumbling noise proceeding from its inside. There was a good-sized hole dug out by the bills of these birds in the neck of the carcass, and also another near its anus, while the stomach was swollen out and distended as if with air. On hitting this with my stick, it appeared to be filled out by something inside, and in a few minutes, to my great astonishment, I found that there were more Vultures all alive inside the carcass! Two, following each other in quick succession, shortly afterwards walked out through the hole in the neck of the bullock, and the first immediately flew off to a neighbouring tree, whilst the other was so gorged he could not do more than waddle off to a rock close by, on which he sat, whilst I left him and concluded my journey. Many a time have I seen Vultures at a carcass, but never before to penetrate inside that of a dead beast.

It is a curious fact, too, that whereas here, in the north-west of India, these birds penetrate into the hills, as in this case, up to the elevation of, and perhaps higher than Simla, or about 6000 feet, one seldom or ever at Darjeeling sees or hears of a Vulture, except perhaps at Punkabaric, which is entirely at the foot of the hills. The same remark applies equally to the next species.

6. *NEOPHRON PERCNOPTERUS*, Linn., of Jerdon. The White Vulture.

*N. ginginianus*, Lath. apud Blyth in 'Ibis' 1866, p. 233.

As mentioned by Jerdon, this is the most abundant scavenger in the upper provinces of India, but is entirely unknown in Lower Bengal. Its limit seems to extend as far only as Raneegunge, a sta-

tion on the line of the East-Indian Railway, distant from Calcutta only 120 miles. In the small intervening space of low, wet, and rice-covered ground it is never to be seen; but directly the dry, sandy, corn-producing country occurs, there it is to be found in abundance. It is occasionally seen in the uplands of Maunbhoom and Bancoorah, but may be described as rare in the latter district, except sometimes in the cold weather. It is especially abundant at Allahabad and at Umballah, where the late Dr. Scott made several observations on it during his long residence there. Some of his notes I subjoin. The sexes copulate on the ground, and, unlike most birds, take some time about this operation. They breed about Umballah in March; and although during the time I was at that station in the spring of 1866 I was unable to secure a nest, Dr. Scott told me that there are generally one or two in his garden, and promised me the eggs, which I subsequently got. Its range extends as far into the Himalayas as Simla, where, with the Bearded Vulture, *Milvus govinda*, and *Gyps bengalensis*, it performs its share of the scavenger work of the station, and is consequently of the greatest use. A Simla specimen had the irides a reddish-pink colour, and legs fleshy. Jerdon gives "dark brown" for the first, and dirty yellow for the colour of the legs.

7. *GYPÆTUS BARBATUS*, Linn. The Bearded Vulture.

Simla, July 20th, 1866. A fine specimen of a young male sent to me by Col. Tytler, which had been shot by his son in the station. Sex, by dissection, a male. The bird when brought was still alive, so that the colour of the fleshy parts here given may be depended on. Length 45 inches; wing  $29\frac{1}{4}$ ; tail  $20\frac{1}{8}$ ; tarsus  $4\frac{1}{8}$ ; bill at gape  $3\frac{3}{4}$ , at front 3, height of bill at base  $1\frac{3}{4}$  in.; extent across wings 8 ft.  $4\frac{3}{4}$  in. Irides pale buff colour, sclerotic membrane orange-red; bill greenish horny; feet bluish plumbeous.

This bird is very abundant at Simla, and may generally be seen quartering slowly over a certain beat along the hill-sides. It does not appear at all wary, as I frequently saw it over Col. Tytler's house, which happened to be favourably placed under a well-known beat of the species along the sides of Mount Jacko. I have seen it after dead cattle, in company with other Vultures, a few miles from Kalka, close to the foot of the hills, elevation perhaps 500 ft. I never observed this bird in the Darjeeling hills; but it doubtless exists there.

11. *FALCO JUGGER*, Gray. The Luggar Falcon.

I only once procured a specimen of this species, at Ambekanuggur in the Maunbhoom district, in January 1865.

16. *HYPOTRIORCHIS CHIQUERA*, Daud. The Turunti or Red-headed Merlin.

Umballah, November 5, 1866. Shot the ♂ out of a pair which were alternately stooping on the racecourse at the small Lark Pipit. Length  $12\frac{1}{4}$  inches; wing 8; tail  $5\frac{1}{2}$ ; tarsus  $1\frac{7}{16}$ ; spread of foot underneath  $2\frac{1}{2}$ ; bill at front  $\frac{5}{8}$ , at gape  $\frac{7}{8}$ , height at base  $\frac{1}{2}$ : cere and



skin round the eye pale yellow. This is one of the boldest and most graceful of the small Indian Raptores, and not uncommon in some parts of the country.

17. *TINNUNCULUS ALAUDARIUS*, Brisson. The Kestrel.

At Baramussia in Maunbhoom, on 8th March, 1865, I shot a young bird in plumage changing to that of the adult. His dimensions were as follows:—Length  $13\frac{1}{2}$  inches; wing  $9\frac{1}{2}$ , expanse 23; tail 6; tarsus  $1\frac{1}{2}$ : feet in colour a bright yellow, with black claws. Round eyes and the cere light yellow. Beak greenish blue, approaching greenish yellow near the top (where it meets the cere), lighter yellow underneath. And again at Simla, in August 1866, I procured both adult and young specimens, and observed several of the latter in Dr. Stoliczka's collection from the interior of the hills. (*Cf.* Ibis, 1867, p. 142.) I give the dimensions of another shot by me, in November 1866, near Umballah. Length  $13\frac{3}{4}$  inches, wing 10, tail  $6\frac{3}{4}$ , tarsus  $1\frac{5}{8}$ , spread of foot  $2\frac{1}{4}$ , extent  $28\frac{3}{4}$ : bill and claws bluish black, cere yellowish white, legs light orange-yellow.

Of that peculiar pigmy genus *Hierax* I never yet met with a specimen alive; and it must be confined therefore to a very limited range in India; for I, who have been over a good portion of it, never heard it mentioned even by the natives in any part I have visited.

22. *ASTUR TRIVIRGATUS*, Temm. The Crested Goshawk.

One of the very few birds of prey procured by me in the Maunbhoom district in 1865 was identified by Mr. Gurney as a young bird of this species, and interested him as being in exactly the same stage of plumage as another received by him shortly afterwards from the island of Formosa. (*Gurney in epist.* 22nd Jan., 1866.)

The same gentleman in another letter tells me that “this species is thought by Professor Schlegel to comprise two races, the Malay race being, in his opinion, distinct from the Indian, and that additional adult Indian specimens would be interesting as tending to elucidate this point” (J. H. G.).

23. *MICRONISUS BADIUS*, Gmelin. The Shikra.

I have procured specimens of this bird on several occasions—in the Maunbhoom district in 1864, and since. I have seen it flown by a falconer at Quail, near Kalka, in 1866, although without much success, owing to the density of the vegetation: it was then thrown from the hand at the flying quarry; and this appears to be the usual native custom with such small hawks.

At Mahasoo near Simla, I shot a bird which Col. Tytler called a species of *Micronisus* that he knew, having previously obtained it near Umballah; but as I do not know exactly to which species to refer it, I subjoin the description from my note-book.

*MICRONISUS*, sp. ?

Mahasoo, near Simla, September 25th, 1866. Young bird of the year apparently. Sex ♂. Irides bright yellow, edged with black;

cere greenish yellow ; base of both upper and lower mandible bluish slaty, tips of both dark horny ; legs greenish yellow, with black claws. Length  $10\frac{5}{8}$  inches, wing  $6\frac{1}{8}$ , tarsus 2, spread of foot underneath  $2\frac{1}{8}$ , tail  $5\frac{1}{4}$ , extent fully 18. This bird is at present in Col. Tytler's private collection.

24. ACCIPITER NISUS, Linn. The European Sparrow-Hawk.

A specimen, ♀ juv. (No. 547 of my catalogue), was procured by me at Ambekanugger, Maunbhoom district, in December 1864. I have not seen it again in the country, but observed some small Hawks frequenting the high *Casuarina* trees regularly every evening at Barrackpore in the same year, which looked like this species on the wing. As I could not shoot, it being a military station, I was unable to secure a specimen and satisfy myself regarding their identity.

25. ACCIPITER VIRGATUS, Temm. The Besra Sparrow-Hawk.

An adult ♂, according to Col. Tytler, was killed by me at Simla, on the 19th June, 1866. This was a very perfect specimen. Irides bright golden red, cere and gape light yellow with a tinge of green ; legs bright yellow, with black claws, bill bluish leaden. Length  $11\frac{5}{8}$  inches ; wing  $6\frac{5}{8}$  ; tail  $5\frac{3}{8}$  ; tarsus nearly 2 ; bill at front, including cere,  $\frac{1}{2}$ , breadth at base  $\frac{7}{16}$ , bill at gape  $\frac{1}{16}$  ; extent  $18\frac{3}{4}$ .

We now come to that fine family amongst the Birds of Prey, viz. the Eagles, which are well represented in India, but of which I have hitherto procured but few specimens, and those generally of the common sorts.

27. AQUILA IMPERIALIS. The Imperial Eagle.

I procured a fine specimen of this fine bird at Umballah, on the 30th November, 1866. It was seated on a low tree, not far from the slaughterhouses belonging to the Commissariat Department ; and I see that the late Dr. Scott, who accompanied me on that occasion, has since procured examples which he transmitted to the Natural-History Society of Montrose. My specimen weighed  $6\frac{1}{4}$  lbs. Length  $30\frac{1}{2}$  inches ; wing  $22\frac{1}{2}$  ; tail  $11\frac{1}{4}$  ; tarsus  $3\frac{3}{4}$  ; spread of foot underneath 6, hind claw alone being  $1\frac{1}{4}$  ; bill at front  $1\frac{7}{8}$ , and at gape  $2\frac{5}{8}$  ; extent 6 feet. This bird was conspicuous by its light rufous-white head, and the large and pure-white feathers at the shoulder of the wing. The irides were brown mixed with pale yellow, the latter colour forming a light ring to the outer circumference of the eye. Cere and feet a very pale yellow ; bill bluish or greenish horny.

I believe that this species subsists about Umballah chiefly on carrion.

29. AQUILA FULVESCENS. The Tawny Eagle.

This, sometimes taken for the Chuhamar, or rat-killer of the natives, is common in the neighbourhood of Umballah, where several examples were procured both by the late Dr. Scott and myself. They may frequently be seen in cantonments, but high in air, soaring about in circles with the common Kite (*Milvus govinda*,

Sykes) and Vultures. A female, killed on November 5th, had the stomach empty. I subjoin the dimensions of several:—

Umballah, November 5th, 1866.

Length.	Wing.	Tail.	Tarsus.	Weight.	Extent.	Spread of foot.
♀. 28 $\frac{1}{4}$ in.	19 in.	10 $\frac{1}{4}$ in.	3 $\frac{3}{4}$ in.	4 $\frac{1}{2}$ lb.	—	5 $\frac{3}{4}$ in.*

November 13th.

25 $\frac{1}{2}$	18 $\frac{1}{2}$	9 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$ lb.	—	—†
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Camp Eesahurree, near Umballah, November 17th.

♂. 25 $\frac{1}{4}$	18 $\frac{1}{2}$	8 $\frac{1}{4}$	3 $\frac{5}{8}$	—	63 in.	—‡
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November 30th.

31	20	11	3 $\frac{5}{8}$	4 $\frac{3}{4}$ lb.	—	6§
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By this list it will be seen that specimens freshly killed vary a good deal in their dimensions, especially as regards their weight.

### 31. AQUILA PENNATA, Gmel. The Dwarf Eagle.

I believe that this Eagle occurs at Umballah, and that I myself have seen it on more than one occasion in flight; but I did not secure any specimens, never having the opportunity; but of the next species (No. 32) I am glad to say I was able to procure both sexes myself at Simla in 1866.

### 32. NEOPUS MALAIENSIS, Reinh. The Black Eagle||. (Plate XXXIV.)

I first observed this rare and beautiful bird when in the Darjeeling Himalayas in 1861 and 1862, and tried, although in vain, to procure specimens then for Dr. Jerdon. I was surprised, when at Simla in 1866, to find it tolerably abundant at Fagoo, where it was also noticed by Col. Tytler (*cf.* Ibis, 1868, p. 195). It was near that place that I procured my first specimen, a female, on 4th August, 1866. My dog Fosco had just put up a pair of Kaleege Pheasants (*Gallophasis albocristatus*) which had taken to a tree, and I was trying to make out their whereabouts, when a Black Eagle suddenly sailed by; and by a long shot, with No. 8 shot, I managed, much to my delight, to wing him, and he fell down the Khud. It is truly a fine bird (*cf.* Ibis, 1867, p. 140), and the young peculiar in plumage (*loc. cit.*), if I am right in my determination of the species of this latter—a view in which, I believe, Col. Tytler concurs. Dimensions of both sexes as follows:—

Length.	Wing.	Tail.	Tarsus.	Spread ft. under-neath.	Hind toe and claw.	Toe alone.	Bill ft.	Gape.	Ext.
♂. 27 $\frac{1}{2}$ in.	21 $\frac{3}{4}$ in.	12 $\frac{1}{4}$ in.	3 $\frac{1}{8}$ in.	5 in.	2 $\frac{1}{8}$ in.	1 $\frac{1}{4}$ in.	1 $\frac{1}{4}$ in.	2 in.	5ft.
♀. 28 $\frac{1}{2}$ –29	22	14 $\frac{1}{4}$	3 $\frac{1}{8}$	5 $\frac{1}{4}$	—	—	1 $\frac{1}{2}$	—	—

\* Irides grey.

† Irides grey brown.

‡ Irides brown.

§ Bill at fr. 1 $\frac{1}{2}$  in.

|| *Cf.* Ibis, 1867, p. 140; 1868, p. 13.

In the latter the spread of the two interior toes underneath was =  $5\frac{1}{4}$  inches. She was shot by a native Shikaree on September 10th.

The male had the remains of a large rat in its stomach; so that it does not prey on pheasants or their eggs exclusively, as hinted by Dr. Jerdon (Birds of Ind. vol. i. p. 66). The female's stomach was empty. Since I got the above pair I have seen another specimen perched upon the dead bough of a lofty fir, *Abies smithiana*, at Fagoo, near Simla, in August 1866.

The irides in both these birds were deep brown (*cf.* Jerd. B. of Ind. vol. i. p. 46); cere, gape, and legs bright yellow; bill dark leaden, nearly black, which latter is also the colour of the claws. Sex ascertained by dissection.

33. NISAETUS BONELLI, Temm. The Crestless Hawk Eagle.

This fine species must be included in the fauna of Simla, and, I believe, also of Umballah, procured in the former station by Col. Tytler, in September 1866, and in the latter, I believe, by the late Dr. Scott, who has sent specimens to Lord Walden.

40. PANDION HALIAETUS, Linn. The Osprey.

Once procured at Maldah, in Lower Bengal, in 1864.

41. POLIOAETUS ICHTHYAETUS, Horsf. The White-tailed Sea-Eagle.

I have seen a colony of this fine Eagle, very near where described by Dr. Jerdon, not far from Caragola Ghaut, on the Ganges.

43. HALIAETUS LEUCOGASTER, Gmel. The Grey-backed Sea-Eagle.

On the 19th September 1865, I observed a fine specimen of this species on the dead bough of a high tree overhanging the Gyne River, near Moulmein, and got within easy shot of it, but was not prepared with the gun. I also observed the species on other occasions when travelling in Burmah by boat, but never managed to secure a specimen.

44. BUTEO VULGARIS, Bechst. The Common Buzzard, = "*B. rufiventer* of Jerdon's Supplement, and equivalent to *B. desertorum* of Daudin, erroneously placed, in Jerdon's last book (Birds of India), under *B. vulgaris*, which I have not yet seen from India, but should be glad also to see if it occurs there" (Gurney *in epist.* Jan. 7, 1866).

45. BUTEO CANESCENS, Hodg. The Long-legged Buzzard. Chuhamar, *i. e.* the Rat-killer of the N. W. P.

I killed a fine specimen of the female of this species at Umballah, on November 5, 1866.

	Length.	Wing.	Tail.	Tarsus.	Weight.
♀.	25 in.	18 in.	$10\frac{1}{4}$ in.	nearly $3\frac{1}{2}$ in.	$2\frac{1}{4}$ lb.

Irides light grey. The stomach only contained a young toad (*Bufo melanostictus*).

I find in my note-book mention made of another species of Buz-



zard (?) or Eagle, which was killed at Umballah on 30th November 1866, by a brother of the late Dr. Scott, with No. 10 shot, on a tamarisk-tree in a neighbouring garden to that occupied by the latter. Its dimensions were as follows:—

Length.	Wing.	Tail.	Tarsus.	Spread of foot un- derneath.	Bill, front.	Gape.	Extent.
20 in.	14 $\frac{3}{4}$ in.	8 $\frac{1}{2}$ in.	2 $\frac{3}{8}$ in.	4 in.	1 $\frac{5}{8}$ in.	1 $\frac{7}{16}$ in.	49 in.

This bird was peculiar in having pure-white spots at the shoulder of the wing (very visible when flying, according to Mr. Scott). The cere was bright golden yellow, irides brown; the bill greenish at base and dark horny at the tip; the legs dully coloured yellow, with strong black claws. Its general colour was dark brown, lighter, approaching white, on the tips of the feathers of the upper tertiaries and the ends of the upper tail-coverts, as well as on the tips of the upper secondaries; tarsus wholly feathered to the foot.

47. *BUTEO PLUMIPES*, Hodg. The Harrier Buzzard.

“This, Mr. Blyth now considers, and, I think, correctly, to be a dark variety, or quasi-melanism, of *Buteo japonicus*” (Gurney in *epist.* January 1866).

48. *POLIORNIS TEESA*, Frank. The White-eyed Buzzard.

This small Buzzard was tolerably abundant about Umballah, in the station of which I got my first specimen, on 23rd October, 1866, and afterwards procured several others, the dimensions of which, in the flesh, I subjoin:—

October 23rd, 1866.

Length.	Wing.	Tail.	Tarsus.	Spread of foot un- derneath.	Bill ft.	Gape.	Extent.
16 $\frac{1}{2}$ in.	11 $\frac{5}{8}$ in.	7 $\frac{1}{8}$ in.	2 $\frac{3}{8}$ in.	2 $\frac{7}{8}$ in.	barely 1 in.	1 $\frac{1}{4}$ in.	35 in.

November 14th, at Lallroo, 8 miles N.W. of Umballah.

♂?	15 $\frac{1}{2}$	11 $\frac{1}{2}$	6 $\frac{3}{4}$	2 $\frac{3}{8}$	2 $\frac{7}{8}$	1 $\frac{1}{16}$	1 $\frac{3}{8}$	36 $\frac{3}{4}$
♀?	17 $\frac{1}{2}$	12 $\frac{1}{2}$	7 $\frac{1}{8}$	2 $\frac{1}{2}$	3	1 $\frac{1}{8}$	1 $\frac{1}{2}$	39 $\frac{3}{4}$

Of the presumed male the weight was  $\frac{3}{4}$  lb.; of the presumed female 17 oz. The irides are pure pearl-white, legs and cere pale orange-yellow, claws and terminal three-fourths of the beak black.

54. *CIRCUS ÆRUGINOSUS*, Linn. The Marsh Harrier.

Of this I procured an example in the Maunbhoom district, on the 5th March, 1865. I find I have recorded of this bird that I shot it in the act of stealing the eggs of the common Speckled Dove (*Turtur suratensis*), from a nest in a sâl tree (*Shorea robusta*). The dimensions in the flesh were as follows:—

Length.	Wing.	Tail.	Tarsus.
20 in.	—	10 in.	3 $\frac{1}{4}$ in.

the wing to the end of the longest primary being 16 $\frac{3}{4}$  inches. Feet and tarsus bright yellow, claws black; the irides also bright yellow.

55. *HALIASTUR INDUS*, Bodd. The Brahminy Kite of Europeans in India; *Dhobee ka cheel* or Washerman's Kite of the natives.

This, as mentioned by Jerdon, is particularly abundant in Lower Bengal, and extends to the Maunbhoom district, where I observed several about tanks near villages, especially at Ambekanuggur, in February 1865. It is rare up the country at Umballah, where I do not recollect ever noticing it, but where is abundantly found the next species.

56. *MILVUS GOVINDA*, Sykes. The Common Pariah Kite of India.

"*Milvus assimilis*, the young. I am satisfied that two species of Kites exist in India, the larger, the true *M. govinda*, appears to be identical with *M. melanotis* of China, Japan, Formosa, and the Loochoo Islands; the smaller I consider identical with *M. assimilis* of Australia and Celebes. The young of *M. govinda*, when first leaving the nest, has both the upper and under plumage interspersed with longitudinal marks, sometimes white, sometimes pale brownish yellow, and about an inch in length. I want to ascertain whether the young of *Milvus affinis* are similarly marked. The latter is very closely related to, though distinct from, the Black Kite of Europe (*M. ater*), which I have seen from Afghanistan and from Northern China, and which may possibly occur in India also" (Gurney in *epist.* January 1866).

I quite agree with Mr. Gurney that there are probably two species of the common Kite in India, as specimens vary so very much in size, although they do not differ much in plumage; and as to *M. ater* being found in India, all I can say is, that in the hilly and jungle portions of the Maunbhoom district, about the villages of Maknu and Chalta in the pergunnah of Ambekanuggur, I repeatedly observed, in 1865, a black Kite, which I was unable to procure; it certainly was more of a Kite than an Eagle, and was not the *Neopus malaiensis*, or Black Eagle, which I had previously observed at Darjeeling. *Milvus govinda* extends up to Simla, in the north-west Himalaya, and is not so common at Umballah as in Lower Bengal. It is essentially a migratory species, disappearing almost entirely from the neighbourhood of Calcutta during the rains.

59. *ELANUS MELANOPTERUS*, Daud. The Black-winged Kite.

A specimen shot in the Maunbhoom district is probably referable to this species. They were particularly abundant in the jungles to the south of Umballah in November 1866, and might frequently be seen hovering like a Kestrel. Dimensions of a freshly killed specimen at Babyn, near Umballah—

Length.	Wing.	Tail.	Tarsus.	Spread ft.	Bill ft.	Gape.	Extent.
12 $\frac{3}{4}$ in.	10 $\frac{1}{8}$ in.	5 in.	1 $\frac{1}{4}$ in.	2 $\frac{3}{4}$ in.	$\frac{5}{8}$ in.	1 $\frac{3}{16}$ in.	30 $\frac{1}{2}$ in.

In one specimen the irides were reddish brown; another (probably an older bird) had them blood-red; the cere and feet light yellow, the latter with black claws; the bill black; the colour above is pale ashy, with blackish upper wing-coverts, and the feathers of the back

tipped slightly with fulvous and white; lower parts pure white, with a slight tinge of fulvous about the breast; eye-streak pure black.

61. *STRIX CANDIDA*, Tickell.

A desideratum in the Norwich Museum (Gurney *in epist.* January 1866).

I myself have observed this species only once. When hunting for leopards in the district of Rungpore, in 1859, several were put up out of grass at the bottom of a half-dried-up piece of water, in thick jungle.

66. *SYRNIUM NIVICOLUM*, Hodg.

"I greatly doubt whether this species is really distinct from *S. aluco* of Europe" (Gurney *in epist.*).

68. *OTUS BRACHYOTUS*, Gmel. The Short-eared Owl.

At Ambekanuggur, in Maunbhoom, in December 1864, a pair of large owls came regularly every evening, just after the stars began to make their appearance, and worked over the rice-kates in which our survey-camp was pitched, apparently for rats. They were so wary that, although I sat up several nights in succession, I never could manage to intercept them. At last, by the merest chance, I secured one, which turned out to be of this species. Their cry is very much like that of a frog when seized by a snake—so much so, that a friend of mine, hearing it close to his tent one night, rushed out in some alarm, with lighted candle and a thick stick, to prevent the supposed snake from entering his sleeping-apartment. The only thing besides that I can compare this cry to is the peculiar mew of a cat which one sometimes hears.

I procured another specimen at Umballah, on November 6th, 1866. Dimensions as follows:—Length  $14\frac{1}{2}$ , wing  $11\frac{1}{2}$ , tail 4, tarsus  $1\frac{3}{4}$ ; spread of foot underneath about 3; bill at front 1 in., at gape  $1\frac{3}{16}$ , extent  $37\frac{1}{2}$  inches. The species was not uncommon about the jungles there, being generally flushed out of long grass.

69. *URRUA BENGALENSIS*, Frank. The Rock Horned Owl.

This species was found in some abundance by me in the Maunbhoom district, and several specimens killed. At Beeru, a village on the road from Perulia to Raneegunge, and also on the Rognathpore Hill; and in all the bear-frequented, rocky and hilly spots in that district they are abundant. They live amongst the rocks, and frequently take to a dead tree bough, if close by, when they are turned up by the coolies one engages to beat out Master Bruin (*Ursus labiatus*) from his and their abode.

"The identity or otherwise of this species with *Bubo ascalaphus* of Northern Africa is still an unsettled point" (Gurney *in epist.*).

71. *HUHUA NIPALENSIS*, Hodg. The Forest Eagle-Owl.

I once procured a fine specimen of this species, at Darjeeling, in

1862, where it was brought me by my sapper orderly, "Bardy," a Nepalese sepoy, who while out after pheasants one day, said that this bird attacked him, and that he was obliged, in self-defence, to shoot it. This specimen is now mounted in the Museum of the Asiatic Society at Calcutta.

72. *KETUPA CEYLONENSIS*, Gmel. The Brown Fish-Owl.

In October 1864, I shot a pair at Maldah, in Lower Bengal. They were found frequenting a large mango tree, on the border of an old unfrequented tank, in heavy jungle. At Umballah, on November 16th, 1866, I got a fine specimen in the late Dr. Scott's compound or garden. It was seated in a tamarisk-tree and being bullied by Crows when killed. Length 21 inches; wing  $14\frac{1}{4}$ ; tail 9; tarsus 3; spread of foot  $4\frac{1}{4}$ ; bill at front  $1\frac{1}{8}$ , at gape 2 in.; extent 52 inches (4 ft. 4 in.). Irides orange, soles of feet yellowish-white, claws and beak black; weight nearly  $2\frac{1}{2}$  lbs. The colour of the claws, if this specimen is correctly named, would, without doubt, justify Hodgson's name of *nigripes*. Dr. Scott told me that some seven or eight of this species had frequented his garden at Umballah the previous year (1865).

73. *KETUPA FLAVIPES*, Hodg. The Tawny Fish-Owl

has been observed at Simla, according to Colonel Tytler; but I did not see it there myself.

74. *EPHIALTES PENNATUS*, Hodg. The Indian Scops Owl. "Khanooria pêcha" of the natives in Maunbhoom.

A bird referable, I think, to this species was brought to me alive by a native at Baramussea, in Maunbhoom, on 27th February, 1865; and I subsequently procured several more in the next month, when the bird was breeding in this district. It was either this species or the next.

75. *E. LEMPIJI*, Horsf.

I find from my notes that I shot an Owl of this genus in a mangoe tope at Ambekanuggur, but cannot, from a mere description, tell which of these nearly allied species my specimens, procured in the Maunbhoom district, really belonged to.

76. *ATHENE BRAMA*, Temm. The Spotted Owlet. *Gāch douria pêcha* of Maunbhoom; "Cherubim" of Europeans in India.

This is a very abundant species almost everywhere in India, at Barrackpore, Mannbhoom district, Umballah, &c., and, from its familiar and confiding habits (nearly always taking up its abode close to men and their houses) is frequently seen. It was very common at Ambekanuggur in Maunbhoom; and I never could, for certainty, ascertain whether it was this bird or *Caprimulgus monticolus*, Frank., which I have repeatedly observed hovering over the rice-kates like a Kestrel, of an evening.